

Addressing Messages and Communications System,” [filed concurrently herewith,] and incorporated herein by reference.

In the Claims

Please add new claims as follows:

27. A method of addressing messages from an interrogator to a selected one or more of a number of communications devices, the method comprising:
establishing for respective devices unique identification numbers;
causing the devices to select random values, wherein respective devices choose random values independently of random values selected by the other devices;
transmitting a communication, from the interrogator, requesting devices having random values within a specified group of random values to respond;
receiving the communication at multiple devices, devices receiving the communication respectively determining if the random value chosen by the device falls within the specified group and, if so, sending a reply to the interrogator; and
determining using the interrogator if a collision occurred between devices that sent a reply and, if so, creating a new, smaller, specified group, using a search tree, wherein at least one level of a search tree is skipped.

28. A method comprising:
using a tree search scheme to determine an identification number of one of a
plurality of wireless identification devices, a search tree being defined for the tree search
scheme; and
skipping a level of the search tree during the tree search scheme.

29. The method of claim 28, wherein skipping the level is done in response to
receiving a first reply from the one of the plurality of wireless identification devices and
receiving a second reply from another of the plurality of wireless identification devices.

30. The method of claim 29, wherein skipping the level is done in response to
detecting a collision between the first reply and the second reply.

31. The method of claim 30, wherein skipping the level is done after completing a
traversal of a previous level in which the collision is detected.

32. The method of claim 29, wherein the first reply includes the identification
number.

33. The method of claim 29, wherein the first reply includes an arbitration number
of the one of the plurality of wireless identification devices.

34. The method of claim 28, wherein arbitration numbers associated with the search tree and the plurality of wireless identification devices uniquely identify at least a majority of the plurality of wireless identification devices.

35. The method of claim 34, wherein the arbitration numbers are randomly generated.

36. The method of claim 28, further comprising using a slotted Aloha scheme in combination with the tree search scheme to determine the identification number.

37. The method of claim 36, further comprising sending a plurality of signals from an interrogator, each of the plurality of signals indicating to the plurality of wireless identification devices a beginning of each of a plurality of slots associated with the Aloha scheme.

38. The method of claim 28, further comprising initiating point-to-point communication with the one of the plurality of wireless identification devices by sending a number that uniquely identifies the one of the plurality of wireless identification device.

39. The method of claim 38, wherein the number is the identification number.

40. The method of claim 28, wherein skipping the level includes skipping more than one level.

41. A method comprising:
sending a first signal from an interrogator to a plurality of RFID devices, the first signal indicating a first level of a search tree in accordance with a tree search arbitration scheme;

receiving a reply from at least a portion of the plurality of RFID devices; and
sending a second signal from the interrogator to the plurality of RFID devices in response to receiving the reply, the second signal indicating a second level of the search tree, wherein a level of the search tree is skipped between the first and second levels.

42. The method of claim 41, further comprising detecting a collision in the reply, and wherein sending the second signal is done in response to detecting the collision in the reply.

43. The method of claim 42, further comprising sending a third signal from the interrogator after sending the first signal and before sending the second signal, the third signal indicating a different subgroup in the first level of the search tree than a subgroup indicated by the first signal.

44. The method of claim 41, further comprising sending an Aloha signal from the interrogator to the plurality of RFID devices, the Aloha signal associated with an Aloha scheme.

45. A method comprising:
sending first and second radio frequency (RF) signals to a plurality of RFID devices;
receiving a reply from at least one RFID device, the reply indicating that a first
number stored in a memory of the RFID device bounded at a first location indicated by the
first RF signal is equal to a first value indicated by the second RF signal; and
sending a third RF signal in response to receiving the reply, the third RF signal
indicating a second number stored in the memory of the RFID device bounded at a second
location that is offset by two or more bits from the first location.

46. The method of claim 45, further comprising detecting a collision in the reply,
and wherein sending the third RF signal is done in response to detecting the collision in the
reply.

47. The method of claim 46, wherein the reply includes an identification number.

48. The method of claim 45, wherein arbitration numbers associated with the
plurality of RFID devices uniquely identify at least a majority of the RFID devices.

49. The method of claim 48, wherein the arbitration numbers are randomly generated.

50. The method of claim 45, further comprising sending a fourth RF signal to the plurality of RFID devices, the fourth RF signal being associated with an Aloha scheme.

51. The method of claim 50, wherein the fourth RF signal indicates a beginning and an end of a slot associated with the Aloha scheme.

52. The method of claim 45, further comprising communicating in a point-to-point manner with the RFID device including sending a number that uniquely identifies the RFID device.

53. The method of claim 52, wherein the number is the identification number.

54. An interrogator comprising instructions that, when executed, cause the interrogator to perform a method comprising:

transmitting a first request for identification, in accordance with a tree search scheme, to a first subgroup of RFID devices associated with a first branch at a first level of a search tree;

skipping a level of the search tree associated with the first branch; and

transmitting a second request for identification, in accordance with the tree search scheme, to a second subgroup of RFID devices associated with the first branch at a second level of the search tree.

55. The interrogator of claim 54, wherein skipping the level is done in response to receiving a reply from the first subgroup of RFID devices and detecting a collision in the reply.

56. The interrogator of claim 55, wherein the method further comprises transmitting a third request for identification, in accordance with the tree search scheme, to a third subgroup of RFID devices associated with a second branch at a third level of the search tree, the third level of the search tree being the level that was skipped associated with the first branch.

57. The interrogator of claim 54, wherein the reply includes an identification number or arbitration number.

58. The interrogator of claim 54, wherein the method further comprises transmitting a command that causes the first and second subgroup of RFID devices to independently generate arbitration numbers associated with the search tree.

59. The interrogator of claim 54, wherein the method further comprises transmitting an Aloha signal to the plurality of RFID devices, the Aloha signal associated with an Aloha scheme.

60. The interrogator of claim 59, wherein the Aloha signal includes a marker to indicate a beginning of each of a plurality of slots associated with the Aloha scheme.

61. The interrogator of claim 54, wherein the method further comprises transmitting a signal that includes a number that uniquely identifies at least one RFID device to communicate in a point-to-point manner with the RFID device.

62. The interrogator of claim 61, wherein the signal further includes a command that causes the RFID device to perform an operation.

63. A method comprising:
affixing a RFID device to an object for tracking and to identify the object, the RFID
device to store an identification number;
sending a first signal from an interrogator to the object, the first signal indicating a
first subgroup at a first level of a search tree in accordance with a tree search;
sending a second signal from the interrogator, the second signal indicating a second
level of the search tree, wherein a level of the search tree is skipped between the first and
second levels within the subgroup;
determining the identification number stored in the RFID device; and
associating the identification number with the object.

64. The method of claim 63, further comprising receiving a reply from the RFID
device in response to the first signal, wherein sending the second signal is done in
response to the reply.

65. The method of claim 63, wherein tracking includes determining the location,
movement, or existence of the object.

66. The method of claim 65, wherein the object is a person.

67. The method of claim 63, further comprising sending a command that causes
the RFID device to generate an arbitration number associated with the search tree.

68. The method of claim 63, further comprising sending a third signal from the interrogator, the third signal being associated with an Aloha scheme.

69. The method of claim 68, wherein the Aloha signal indicates a beginning and an end of a slot period of the Aloha scheme.

70. An interrogator comprising:
a transmitter circuit to send a first signal to indicate a first value and a first location associated with a first level of a search tree to a plurality of RFID devices; and
a receiver circuit to receive a reply signal indicating if a portion of an identification number associated with the first location is equal to the first value; and
a collision detection circuit to determine if there is a collision in the reply signal, the transmitter to send a second signal to indicate a second value and a second location associated with a second level of the search tree in response to the collision detection circuit detecting a collision, a level of the search tree being skipped between the first and second levels.

71. The interrogator of claim 70, further comprising a memory to store a value received from one of the plurality of RFID devices.

72. The interrogator of claim 70, wherein the transmitter circuit, in response to the collision detection circuit detecting a collision, is to further send a third signal, the third signal being associated with an Aloha scheme.

73. The interrogator of claim 72, wherein the third signal indicates a beginning and an end of a slot of the Aloha scheme.

74. A system comprising:
an interrogator to use a search tree in a tree search scheme to determine an identification number of each of a plurality of wireless identification devices, the interrogator to skip a level of the search tree;
an object; and
a wireless identification device, responsive to the interrogator, affixed to the object to identify the object.

75. The system of claim 74, wherein the transmitter circuit is to further use an Aloha scheme in combination with the tree search scheme, to determine the identification number of each of the plurality of wireless identification devices.

76. The system of claim 75, wherein the interrogator is to control the Aloha slot timing associated with the Aloha scheme.